The listing of claims will replace all prior versions and listings of claims in the application:

Listing of Claims:

3. (previously amended): A method for measuring an amount of a peroxide or an amount of a peroxyl ion of a sample comprising the following steps:

(a) irradiating at least a portion of the sample with a laser light for generating a Raman spectrum of the sample;

(b) obtaining a Raman spectrum for obtaining at least two measurements at two different wavenumbers, a first measurement related to a Raman intensity related to an amount of a peroxide or an amount of a peroxyl ion, and a second measurement related to the other of an amount of a peroxide and an amount of a peroxyl ion;

(c) formulating a relationship between a Raman intensity for a peroxide and a Raman intensity for a peroxyl ion by comparing information related to the two measurements for determining the amount of a peroxide or the amount of a peroxyl ion; and,

(d) varying the amount of a peroxyl ion by varying a pH of the solution,

wherein the relationship between the Raman intensity for a peroxide and the Raman intensity for a peroxyl ion is at least one of a product, a ratio, and a sum of the two measurements.

4. (previously amended): A method as defined in claim 3 wherein an extent of bleaching is determined from the relationship, said extent of bleaching being related to an amount of a peroxide or an amount of a peroxyl ion.

5. (original): A method as defined in claim 3 wherein an extent of ionisation of peroxide is determined from a non-linear relationship including a ratio between the Raman intensity of peroxide and the peroxyl ion.

6. (previously amended): A method for measuring an amount of a peroxide or an amount of a peroxyl ion of a sample comprising the following steps:

(a) irradiating at least a portion of the sample with a laser light for generating a Raman spectrum of the sample;

(b) obtaining a Raman spectrum for obtaining at least two measurements at two different wavenumbers, a first measurement related to a Raman intensity related to an amount of a peroxide or an amount of a peroxyl ion, and a second measurement related to the other of an amount of a peroxide and an amount of a peroxyl ion;

(c) formulating a relationship between a Raman intensity for a peroxide and a Raman intensity for a peroxyl ion by comparing information related to the two measurements for determining the amount of a peroxide or the amount of a peroxyl ion; wherein the relationship between the Raman intensity for a peroxide and the Raman intensity for a peroxyl ion is at least one of a product, a ratio, and a sum of the two measurements and,

wherein the Raman intensity for a peroxide is obtained at approximately 877cm^{-1} and the Raman intensity for a peroxyl ion is obtained at approximately 850 cm^{-1}.

7. (previously amended): A method for measuring an amount of a peroxide or an amount of a peroxyl ion of a sample comprising the following steps:

(a) irradiating at least a portion of the sample with a laser light for generating a Raman spectrum of the sample;

(b) obtaining a Raman spectrum for obtaining at least two measurements at two different wavenumbers, a first measurement related to a Raman intensity related to an amount of a peroxide or an amount of a peroxyl ion, and a second measurement related to the other of an amount of a peroxide and an amount of a peroxyl ion;

(c) formulating a relationship between a Raman intensity for a peroxide and a Raman intensity for a peroxyl ion by comparing information related to the two measurements for determining the amount of a peroxide or the amount of a peroxyl ion; wherein the relationship between the Raman intensity for a peroxide and the Raman intensity for a peroxyl ion is at least one of a product, a ratio, and a sum of the two measurements and,

wherein a characteristic of a pulp or pulp effluent contained in the sample is determined from the relationship, said characteristic being one of pulp brightness, pulp yellowness, and bleaching efficiency.

8. (original): A method as defined in claim 7 wherein the characteristic is related to at least one of an absorption and scattering of pulp or textiles.

9. (original): A method as defined in claim 7 further comprising the step of adjusting an amount of peroxide for obtaining a predetermined amount of peroxide for adjusting the characteristic of the sample.

Cont C1

13. (previously amended): A method for determining a property of a sample comprising the steps of:

(a) irradiating at least a portion of the sample with a laser light for generating a Raman emitted light from the sample;

(b) obtaining at least two measurements of the Raman emitted light between 200 cm^{-1} and 4000 cm^{-1}, a first measurement at a first wavenumber and a second measurement at a second wavenumber; and

(c) determining a non-linear relationship between the at least two measurements and the property of the sample,

wherein the non-linear relationship is determined by regression methods and,

wherein the non-linear relationship is expressed as at least one of the following functions between the property of the sample and the first and second measurement:

property of sample = f (first measurement, first measurement / second measurement);

property of sample = f (first measurement, first measurement * second measurement);

property of sample = f (first measurement, first measurement / (first measurement + second measurement)); and

property of sample = f (first measurement, (first measurement + second measurement) / first measurement).

14. (previously amended): A method for determining a property of a sample comprising the steps of:

(a) irradiating at least a portion of the sample with a laser light for generating a Raman emitted light from the sample;

(b) obtaining at least two measurements of the Raman emitted light between 200 cm^{-1} and 4000 cm^{-1}, a first measurement at a first wavenumber and a second measurement at a second wavenumber;

(c) obtaining at least a third measurement of the Raman emitted light between 200 cm^{-1} and 4000 cm^{-1}; and,

(d) determining a non-linear relationship between the at least three measurements and the property of the sample,

wherein the non-linear relationship is determined by regression methods.

15. (original): A method as defined in claim 14 further comprising the step of formulating at least two ratios from the at least three measurements.

16. (original): A method as defined in claim 13 further comprising the step of controlling the property in a process using feedback control for adjusting at least one feed input component in accordance with a determined value of the property for obtaining a predetermined value of the property.

17. (original): A method as defined in claim 16 wherein the sample is produced by one of a wood pulp bleaching process and a wood pulp delignification process.

18. (original): A method as defined in claim 16 wherein the property is one of an equilibrium property, a property that occurs due to competitive processes where relative rate constants are important, and a property that signifies an extent of a reaction.

19. (original): A method as defined in claim 18 wherein the property is one of pulp bleaching and pulp delignification.

20. (original): A method as defined in claim 18 wherein the property that signifies the extent of the reaction is a degree of polymerisation.

21. (original): A method as defined in claim 18 wherein the property is one of a degree of polymerisation, ionisation, and network formation of a silicate solution.

22. (original): A method as defined in claim 18 wherein the property is related to an amount of organic substances in the sample, said property being one of chemical oxygen demand, biological oxygen demand, and total organic carbon.

23. (original): A method as defined in claim 18 wherein the property is one of an amount of ionised species and a charge density.

24. (original): A method as defined in claim 18 wherein the property is related to a propensity to form scale.

25. (original): A method as defined in claim 18 wherein the property is an oxidation reduction potential of the sample or another measure of the oxidative or reductive capacity of the sample.

26. (original): A method as defined in claim 18 wherein the property is a relative amount of a transient species with respect to either a reactant or a product during a chemical reaction or processing step.

31. (deleted)

32. (currently amended): A method ~~as defined in claim 31~~ for determining a potential of an oxidative reductive process comprising the following steps:

(a) irradiating at least a portion of the sample with a laser light for generating a Raman emitted light from the sample;

(b) obtaining at least two measurements of the Raman emitted light between 200 cm^{-1} and 4000 cm^{-1}, a first measurement at a first wavenumber, and a second measurement at a second wavenumber; and

(c) determining a relationship between the two measurements and the potential of the oxidative reductive process,

wherein the relationship includes at least a ratio based on the two measurements and,

wherein the sample includes molecules with elements that exist in one of a plurality of oxidation states, and

wherein the elements include nitrogen, sulfur, phosphorus, chlorine, manganese, and chromium.

33. (currently amended): A method ~~as defined in claim 31~~ for determining a potential of an oxidative reductive process comprising the following steps:

(a) irradiating at least a portion of the sample with a laser light for generating a Raman emitted light from the sample;

(b) obtaining at least two measurements of the Raman emitted light between 200 cm^{-1} and 4000 cm^{-1}, a first measurement at a first wavenumber, and a second measurement at a second wavenumber; and

(c) determining a relationship between the two measurements and the potential of the oxidative reductive process,

wherein the relationship includes at least a ratio based on the two measurements and,

wherein the sample includes molecules with elements that exist in one of a plurality of oxidation states, and

wherein the molecules include sulfides, cyanides, chromates, and nitrates.

34. (currently amended): A method ~~as defined in claim 31~~ for determining a potential of an oxidative reductive process comprising the following steps:

(a) irradiating at least a portion of the sample with a laser light for generating a Raman emitted light from the sample;

(b) obtaining at least two measurements of the Raman emitted light between 200 cm^{-1} and 4000 cm^{-1}, a first measurement at a first wavenumber, and a second measurement at a second wavenumber; and

(c) determining a relationship between the two measurements and the potential of the oxidative reductive process,

wherein the relationship includes at least a ratio based on the two measurements and,

wherein the sample includes molecules with elements that exist in one of a plurality of oxidation states, and

wherein the molecules are substances for one of bleaching pulp, textiles, and food substances, said molecules selected from the group consisting of sulfite, chlorine dioxide, and chlorite~~, and hydrogen peroxide~~.

38. (previously amended): An apparatus for determining a property of a sample comprising:

a laser light source for irradiating at least a portion of the sample for generating a Raman emitted light from the sample;

a detector for detecting the Raman emitted light from the sample, said detector for obtaining at least two measurements of the Raman emitted light, a first measurement at a first wavenumber and a second measurement at a second wavenumber; and

a processor for receiving and processing data from the detector for determining a non-linear relationship between the at least two measurements and the property of the sample,

wherein the non-linear relationship is determined by regression methods and,

wherein the non-linear relationship is expressed as at least one of the following functions between the property of the sample and the first and second measurement:

property of sample = f (first measurement, first measurement / second measurement);

property of sample = f (first measurement, first measurement * second measurement);

property of sample = f (first measurement, first measurement / (first measurement + second measurement)); and

property of sample = f (first measurement, (first measurement + second measurement) / first measurement).

39. (original): An apparatus as defined in claim 38 further comprising a member for controlling the property in a process using feedback control for adjusting at least one feed input component in accordance with a determined value of the property for obtaining a predetermined value of the property.

Cont'd Cl

43. (deleted)

44. (deleted)